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Bemerkungen • Remarks • Remarques

Object: telephone interview for PCT application GB99/01031 (ref. X042/P491)

Dear Sir,

I am pleased to be able to respond positively to your request for a telephone interview (Rule 66.6 PCT). An interview can be arranged on Monday 19.6.2000 at 10h00 to discuss the remaining mayor deficiencies of the PCT application GB99/01031 and the lack of inventive step (Art. 33(3) PCT) over a combination of the prior art documents.

I would like to invite you to call me at +49-89-2399 8336 on Monday. If you have further question please contact our formalities officer Mr. Schall at phone +49-89-2399-2647.

16.06.2000

Datum • Date

Unterschrift • Signature

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13 SEPTEMBER 1999



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REC'D 27 SEP 1999	
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Bescheinigung

Certificate

Attestation

Die angehefteten Unterla-
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europäischen Patentanmel-
dung überein.

The attached documents
are exact copies of the
European patent application
described on the following
page, as originally filed.

Les documents fixés à
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conformes à la version
initialement déposée de
la demande de brevet
européen spécifiée à la
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Patentanmeldung Nr. Patent application No. Demande de brevet n°

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PRIORITY DOCUMENT

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Blatt 2 der Bescheinigung
Sheet 2 of the certificate
Page 2 de l'attestation

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Anmelder:
Applicant(s):
Demandeur(s):
CAMBRIDGE CONSULTANTS LIMITED
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UNITED KINGDOM

Bezeichnung der Erfindung:
Title of the invention:
Titre de l'invention:
Decision aid

In Anspruch genommene Priorität(en) / Priority(ies) claimed / Priorité(s) revendiquée(s)

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Remarks:
Remarques:

Decision Aid

Field of the invention

5 The present invention relates to technical implementations of methods of aiding decisions when deciding between a plurality of similar products, services or control strategies, in particular to such implementations which use weightings of a number of relevant factors.

10

Background Art

Consider a situation where a potential customer is faced with selecting the most appropriate product or service from a
15 selection that is great in number.

It can appear to the customer that the products or services are quite similar and their differences are not that apparent, and further, the decision-making process is complicated by the
20 extent of the selection. A customer may typically lack the confidence that any particular product or service is a good match with their needs, and in consequence such a customer will often not reach a decision to purchase even though very suitable products are offered.

25

There is therefore a need for a decision aid that assists a customer in purchasing decisions. Such a decision can produce a short list of products or services which are a good match with the customer's needs together with justification or
30 explanation relating to the selection in the short list. Such a short list can allow the customer to make the easier final choice from say twenty products or services that appear to the user only to be generally suitable.

35 'Decision Guide' - a software package that allows users to slide sliders one at a time in order to state how important various features of a holiday are is known in the art. This package treats features uniformly in identifying holidays

2

which match the set of criteria that are important to the user.

Rackham's book on 'Making Major Sales' lays out the theory
5 that consumers' behaviour can be modelled by:

- identifying a set of criteria that the consumer considers important in evaluating a product or service;
- 10 - ranking the importance of these selection criteria to the customer;
- identifying leading 'best match' products and services according to a principle based on the match with criteria ranked highly by the consumer in preference to the match
15 with those criteria ranked lowly by the consumer.

However, Rackham does not indicate a mechanism for implementing his theory.

20

Present systems do not allow decision makers to non-linearly weight their decision criteria in order to arrive at an optimum ranking of products/services.

25

Summary of the Invention

The invention provides an information sorting system for use in ranking a plurality of products/services according to the
30 apparent desirability of each product/service to a system user which comprises a memory means which stores information on the plurality of services/products in the form of scores relating to a number of predetermined features of the products/services, a user interface which allows a user to
35 indicate how important each of the number of predetermined features are to them calculating means for calculating a score for each product/service according to the following formula:

$$S_p = f(s_{i,p}, I_i); \quad i \in \{1 \dots N\}; \quad p \in \{1 \dots Q\}$$

wherein

- 5 S_p represents the overall score for a particular product p
 $f(\dots)$ represents 'some function of'
 $s_{i,p}$ represents the individual score for feature i of
product p (in the range from s_{\min} to s_{\max})
 I_i represents the importance of feature i to the user
10 N represents the number of predetermined features
Q represents the number of products/services

15 The invention provides a system which non-linearly weights the
various features and provides a fast, efficient manner for
ranking a plurality of similar products/services.

The invention also provides a powerful means for translating a
system-user's apparent preferences into a decision which may be
20 used in controlling a machine based on a machine operator's
preferences.

Further objectives and advantages of the invention will become
apparent from a consideration of the ensuing description.

25

Brief Description of Drawings

The single figure shows a typical embodiment according to the
30 invention implemented for a simple scenario involving a user
choosing from amongst a plurality of mobile phones.

Detailed description of the invention

The present invention provides a system which provides a user with a method of using Rackham's theories without having to understand them. The invention combines:

- a technique for interacting with the user that allows the user to indicate the importance of criteria for selecting a product or service, and in so doing allows the ranking of the criteria to be inferred;
- an algorithm for scoring which places a greater weight on the match of candidate products or services for criteria ranked highly by the user and which places a lesser weight on the match of candidate products or services for criteria ranked lowly by the user;
- a technique for ranking the scores of candidate products or services and displaying the leading products or services deduced to be the most appropriate for the user.

The present invention involves the novel combination of a user interface comprising several sliders with Rackham's hypothesis and with a novel weighted matching algorithm to rank products or services being chosen amongst. Each product or service is given a score based on how well its feature strengths match the needs of a user of the system of the invention as expressed by the positions of the sliders.

In general, the novel algorithm may be represented as follows:

$$S_p = f(s_{i,p}, I_i); \quad i \in \{1 \dots N\}; \quad p \in \{1 \dots Q\}$$

wherein

S_p represents the overall score for product p
 $f(\dots)$ represents 'some function of'

5

- $s_{i,p}$ represents the score for feature I of product p (in the range from s_{\min} to s_{\max})
 I_i represents the importance of feature I to the user
 N represents the number of features
 Q represents the number of products or services

A simple implementable example of the general algorithm given above would be:

$$S_p = \sum_{i=1 \text{ to } N} (s_{i,p} \times I_i)$$

The system displays a score bar indicating how well a product or service matches the user's criteria.

- 15 The score value may be normalised relative to the maximum score a perfect product or service could obtain. Using the simple example given above, this would mean:

$$\text{Length of score bar} = \frac{\sum_{i=1 \text{ to } N} (s_{i,p} \times I_i)}{\sum_{i=1 \text{ to } N} (s_{\max} \times I_i)} = \frac{\sum_{i=1 \text{ to } N} (s_{i,p} \times I_i)}{s_{\max} \times \sum_{i=1 \text{ to } N} (I_i)}$$

- 25 In a preferred embodiment, the scoring algorithm is adjusted to give the same subjective ranking that would be chosen by a salesperson who is an expert at selling the range of products or services. This is achieved either by tuning the scoring algorithm according to heuristics or using neural network techniques to score the product match.

- 30 When used in a control system, the information sorting system of the current invention allows the control system to make qualitative choices between the various control strategies which the control system has available to it based on a system operator's indicated preferences - without a need for the system operator to do more than indicate these preferences. No
 35 prior art information sorting system allowed such a simple operator interaction with a controlled system.

Claims

1. An information sorting system for use in ranking a plurality of products/services according to the apparent desirability of each product/service to a system user which comprises:

- a memory means which stores information on the plurality of services/products in the form of scores relating to a number of predetermined features of the products/services;

- a user interface which allows a user to indicate how important each of the number of predetermined features are to them

- calculating means for calculating a score for each product/service according to the following formula:

$$S_p = f(s_{i,p}, I_i); \quad i \in \{1 \dots N\}; \quad p \in \{1 \dots Q\}$$

wherein

S_p represents the overall score for a particular product p

$f(\dots)$ represents 'a function of'

$s_{i,p}$ represents the individual score for feature i of product p (in the range from s_{\min} to s_{\max})

I_i represents the importance of feature i to the user

N represents the number of predetermined features

Q represents the number of products/services

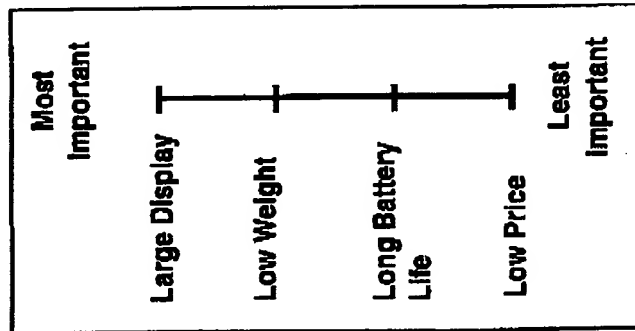
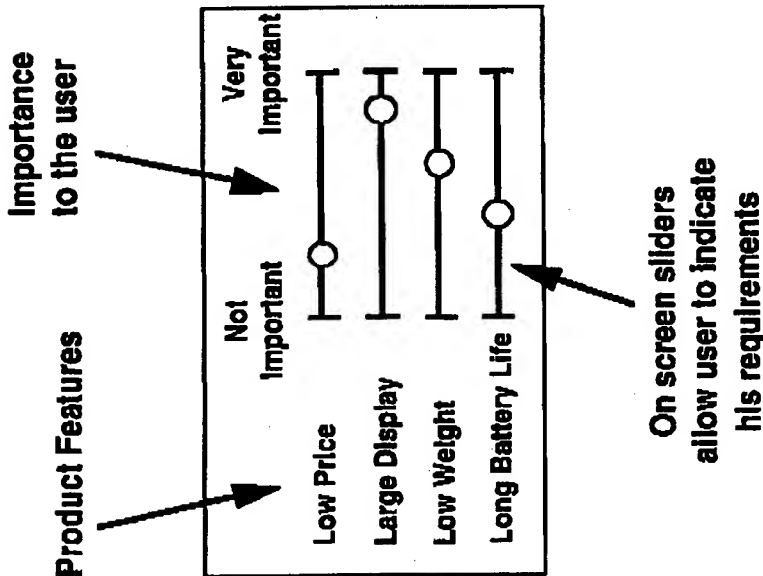
2. An information sorting system according to claim 1 which further comprises display means for displaying a ranked list of products/services to the user.

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3. An information sorting system according to claim 1 which is used as part of a control system in which the product/service with the highest score is used as a basis for automatically deciding which control strategy from a plurality of available control strategies is to be executed by the control system.

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Rackham's representation of the user's requirements

Rank ordering translates the user's slider input to Rackham's representation

